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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEE, RIP A

ART UNIT	PAPER NUMBER
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1796

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/525,035	Applicant(s) JACOBSEN ET AL	
	Examiner Rip A. Lee	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on September 26, 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6,7 and 9-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6,7 and 9-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1796

DETAILED ACTION

This office action follows a response filed on September 26, 2007. Claims 1, 3, 4, 6, 7, and 9-33 are pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 3, 4, 6, 7, and 9-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are drawn to a process of combining a "metallocene catalyst" with several other components. It is not clear whether Applicant intends to claim a catalyst derived from metallocene or metallocene compound (catalyst precursor). From the specification, it appears that the claimed "metallocene catalyst" is, indeed, a metallocene compound. The compound itself, is not catalytic, and therefore, the description in the claims does not appear to be accurate. Elucidation and/or appropriate amendment is required.

Claim Rejections - 35 USC § 102 / 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1, 6, 7, 9-11, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Carnahan *et al.* (WO 00/15672).

Example 2 of Carnahan *et al.* is relevant. The example shows a process of combining porous support, polymerizable monomer, metallocene catalyst, and co-catalyst to make a supported polymerization catalyst system. In a first step, TEA/silica is introduced into a reaction

Art Unit: 1796

vessel. This implies that co-catalyst is added to a porous support. Next, ethylene, a polymerizable monomer, was added. Then, a supported catalyst prepared from $(\text{Cp}^*\text{SiMe}_2\text{N-}t\text{-Bu})\text{Ti}(\eta^4\text{-1,3-pentadiene})$, $\text{B}(\text{C}_6\text{F}_5)_3$, TEA, and silica was added. Note that this component is catalytically active, and therefore, it meets the limitation "metallocene catalyst." As such, the prior art discloses a process that follows the steps outlined in the instant claims. Polymerizations are carried out in the gas phase in a fluidized bed reactor (pages 21 and 22).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Carnahan *et al.*

Carnahan *et al.* discloses that catalysts may be used for polymerization of alpha olefin such as 1-hexene, as well as copolymers of ethylene and 1-hexene (page 18). It would have been obvious to one having ordinary skill in the art to add 1-hexene (co)monomer at the same stage as that taught in example 2, and thereby arrive at the subject matter of the instant claim.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carnahan *et al.* in view of Cady *et al.* (WO 97/44371).

Although Carnahan *et al.* discloses use of neutral boron compounds as activator, the reference does not disclose use of ionic borates. However, at the time the invention was made, ionic borates were well-known activators for metallocene based catalysts. Cady *et al.* teaches that metallocenes activated with ionic borates are highly active polymerization catalysts (pages 21 and 22) and that they afford substantially the same active species as compared to activation with trialkylaluminum compounds and aluminoxanes (pages 26 and 27). The combination of teachings would have suggested to one having ordinary skill in the art that metal complexes in Carnahan *et al.* would also be activated with ionic borates. Therefore, it would have been obvious to one having ordinary skill in the art to use an ionic borate as the co-catalyst, and one having ordinary skill in the art would have reasonably expected functionally equivalent species to produce active catalysts.

Art Unit: 1796

7. Claims 19, 21-26, and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andell *et al.* (U.S. 6,225,423).

Andell *et al.* discloses preparation of a supported catalyst system by contacting in organic solvent a transition metal compound and 0.05-500 moles of an unsaturated organic compound per mole of transition metal compound (claim 1). In one embodiment of the invention, the mixture is brought into contact with a solid carrier (col. 10, lines 18-20), and the resulting material is isolated. This pre-initiation step affords a stabilized precursor catalyst. One having skill in the art, have found recognized that this process affords a system which can be stored for later use. Inventive catalysts also contain an aluminoxane activator in order to activate the metallocene component (col. 6, lines 14-41). Although the activator is not mentioned in this aspect of the invention, it would have been obvious to one having ordinary skill in the art to activate the supported catalyst precursor with aluminoxane in order to obtain a catalytically active material. Thus, it would have been obvious to carry out the process described above and further activate the precursor material with aluminoxane. Regarding the method of addition of unsaturated compound, the reference teaches that solutions of reagents are added to the support in such a manner that the volume of the solution does not exceed the pore volume of the carrier (col. 13, lines 10-14). This is the well-known "incipient wetness" method, which is used to control homogeneous distribution of the reagents onto the support. Thus, it would have been obvious to one having ordinary skill in the art to use the incipient wetness method to add the solution of metallocene and unsaturated organic compound because Andell *et al.* teaches this process for adding materials to solid support. The unsaturated compound is 1-hexene, as shown in the example 5, and one having ordinary skill in the art would have found it obvious to use 1-hexene as the unsaturated compound in the embodiment described above. The process of the invention of Andell *et al.* is general, and it may be carried out with a variety of metallocenes such as those disclosed in WO 95/00562, which is incorporated by reference (col. 9, line 1). The incorporated reference discloses metal complexes as described in the instant claims. Monomers which may be polymerized are listed in col. 12, lines 33-39. Polymerizations may be carried out in the gas phase (col. 12, line 20).

Art Unit: 1796

8. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andell *et al.* in view of Cady *et al.*

Although Andell *et al.* discloses use of aluminoxanes as activator, the reference does not disclose use of ionic borates. However, at the time the invention was made, ionic borates were well-known activators for metallocene based catalysts. Cady *et al.* teaches that metallocenes activated with ionic borates are highly active polymerization catalysts (pages 21 and 22) and that they afford substantially the same active species as compared to activation with trialkylaluminum compounds and aluminoxanes (pages 26 and 27). The combination of teachings would have suggested to one having ordinary skill in the art that metal complexes in Andell *et al.* would also be activated with ionic borates. Therefore, it would have been obvious to one having ordinary skill in the art to use an ionic borate as the co-catalyst, and one having ordinary skill in the art would have reasonably expected functionally equivalent species to produce active catalysts.

9. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andell *et al.* in view of Carnahan *et al.*

Andell *et al.* does not state that gas phase reactions are to be carried out in a gas phase reactor. Carnahan *et al.* discloses that gas phase polymerization reactions are conventionally carried out in a gas phase in a fluidized bed reactor (pages 21 and 22), and therefore, it would have been obvious to one having ordinary skill in the art to carry out gas phase polymerizations using the catalysts of Andell *et al.* in a gas phase fluidized bed reactor.

Art Unit: 1796

10. Claims 1, 3, 4, 6, 7, 11, 14-23, 26, and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang *et al.* (U.S. 6,184,170).

Chang *et al.* discloses preparation of a supported catalyst system containing a support, a metallocene complex, an activator, an unsaturated promotor, and additionally, an alpha olefin co-promotor. The reference disclose a series of permutations for addition of components. In one embodiment, metallocene and a portion of the activator are combined to produce a catalytically active metallocene catalyst. This is combined with support, and the remainder of activator is added, followed by promotor (col. 10, lines 30-36). It can be seen that promotor may be added to the support in a separate step, and this is consistent with the teaching that promotor may be added at any point during the formation of the catalyst system. One gleans from the other embodiments that the critical feature is that metallocene and activator must be pre-contacted prior to addition to support (col. 9, lines 53-56 and col. 10, lines 8-23). Since the introduction of promotor, and correspondingly, co-promotor, is not critical, one having ordinary skill in the art, absent any showing of criticality or unexpected results, would have found it obvious to add promotor to the support, followed by aluminoxane, and then the solution of aluminoxane/metallocene. The person of ordinary skill in the art also would have found it obvious to add aluminoxane to the support, followed by promotor, and then the solution of aluminoxane/metallocene. Since the selection of any order of performing process steps is *prima facie* obvious in absence of new or unexpected results,[†] and since Chang *et al.* does not restrict addition of promotor and co-promotor to any sequence and appears only to require addition of some metallocene/aluminoxane concurrently, it is maintained the appropriate addition of materials to the support is a matter of routine experimentation and would have been well within the skill level of, and thus obvious to, one of ordinary skill in the art.

Regarding the amount of solution to add to the support, Chang *et al.* teaches that the volume of solution applied to porous support should be less than 2 times the pore volume of the support (col. 10, line 3). One of ordinary skill in the art recognizes this refers to the well-known "incipient wetness" method, which is used to control homogeneous distribution of the reagents onto the support. While Chang *et al.* states that this should be used for adding metallocene/aluminoxane to support, rather than promoter and co-promotor, it would have been

Art Unit: 1796

obvious to one having ordinary skill in the art to use the incipient wetness method to add all reagents to support so that the homogeneous distribution of all catalyst components may be achieved.

The alpha olefin co-promotor is 1-hexene (col. 10, line 50, col. 16, line 62), and since this appears to be a useful co-promotor, one having ordinary skill in the art would have found it obvious to use 1-hexene for this purpose. Catalysts of the invention are used for polymerization of select monomers (col. 10, line 11, line 61 – col. 12, line 56), and polymerization may be carried out in the gas phase by use of a fluidized bed reactor (col. 13, line 8).

11. Claims are 12, 13, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang *et al.* in view of Cady *et al.*

Although Chang *et al.* discloses use of aluminoxanes as activator, the reference does not disclose use of ionic borates. However, at the time the invention was made, ionic borates were well-known activators for metallocene based catalysts. Cady *et al.* teaches that metallocenes activated with ionic borates are highly active polymerization catalysts (pages 21 and 22) and that they afford substantially the same active species as compared to activation with trialkylaluminum compounds and aluminoxanes (pages 26 and 27). The combination of teachings would have suggested to one having ordinary skill in the art that metal complexes in Chang *et al.* would also be activated with ionic borates. Therefore, it would have been obvious to one having ordinary skill in the art to use an ionic borate as the co-catalyst, and one having ordinary skill in the art would have reasonably expected functionally equivalent species to produce active catalysts.

[†] *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA, 1930)

Art Unit: 1796

Response to Arguments

12. The rejection of claims under 35 U.S.C. 103(a) as being unpatentable over Hokkanen *et al.*, set forth in the previous office action dated June 11, 2007, has been withdrawn in view of amendments to claims.

New rejections have been presented, and therefore, this office action is made non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu S. Jagannathan, can be reached at (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



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December 10, 2007